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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/665,137	09/18/2003	Torsten Gerlich	331.1050	5808
23280	7590	11/30/2006	EXAMINER	
DAVIDSON, DAVIDSON & KAPPEL, LLC 485 SEVENTH AVENUE, 14TH FLOOR NEW YORK, NY 10018			KITOV, ZEEV V	
			ART UNIT	PAPER NUMBER
			2836	

DATE MAILED: 11/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/665,137

Applicant(s)

GERLICH ET AL.

Examiner

Zeev Kitov

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 October 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 - 8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 - 8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>08/09/06</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION


In view of the Appeal Brief filed on August 14, 2006, PROSECUTION IS
HEREBY REOPENED. A new ground of rejection is set forth below.

To avoid abandonment of the application, appellant must exercise one of the
following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply
under 37 CFR 1.113 (if this Office action is final); or,

(2) initiate a new appeal by filing a notice of appeal under 37 CFR 41.31 followed
by an appeal brief under 37 CFR 41.37. The previously paid notice of appeal fee and
appeal brief fee can be applied to the new appeal. If, however, the appeal fees set forth
in 37 CFR 41.20 have been increased since they were previously paid, then appellant
must pay the difference between the increased fees and the amount previously paid.

A Supervisory Patent Examiner (SPE) has approved of reopening prosecution by
signing below:



BRIAN SIRCUS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all
obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 - 3, 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Busato (WO 99/06893) in view of Horowitz et al. textbook, The Art of Electronics and Shacklock et al. (US 5,231,722). Busato discloses most of the elements of Claim 1 including the electromagnetic valve being actuated by pulse-width modulation and having a pulsed mode and a proportional mode having a higher frequency than the pulsed mode (Specification, page 7, lines 4 – 34), a solenoid (element 46 in Fig. 4) a power source for supplying the solenoid with electricity (+14.0 VDC in Fig. 4); a control unit (element 113 in Fig. 4) generating pulse-width-modulated signals (upper trace in Fig. 9); a switching device (element 26b in Fig. 4), the solenoid receives the pulse-width-modulated signals of the control unit via the switching device. However, it does not disclose a suppression device. Horowitz et al. disclose a suppression device (diode in Fig. 2.4) connected in parallel to the inductor. It further makes a general statement in the Fig. 2.4 legend: "always use a suppression diode when switching an inductive load". It is general recommendation based on analysis of processes when the semiconductor switch drives the inductive load (pages 52 – 53) made irrespective of a pulse repetition rate, pulse width or any other pulse parameters. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the Busato solution by adding the protecting diodes according to Horowitz et al., because as Horowitz et al., state (page 64, left column), without this diode the inductor swing the collector to a large positive voltage when the switch is

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opened, most likely exceeding the collector-emitter breakdown voltage, thus endangering the transistor. Shacklock et al. disclose a solenoid driven by the switching device (72 in Fig. 6), the solenoid capable of receives the proportional pulse-width-modulated signals of the control unit via switching device (col. 15, lines 9 – 35); and a suppression device (74 in Fig. 6) for suppressing high-induced voltages at the solenoid. The solenoid is actuated by a pulse-width modulation at frequency 1 Khz (col. 12, lines 7 – 9, col. 15, lines 23 – 25), thus demonstrating that the upper frequency limit for use of the free wheeling diodes is far higher than the 200 Hz recited by Applicant. The motivation for use of the free wheeling diodes according to Shacklock is the same as above.

Regarding Claim 2, Horowitz et al discloses the suppression device as a free wheeling diode (diode in Fig. 2.4) connected in parallel to the solenoid. A motivation for modification of the primary reference is the same as above.

Regarding Claim 3, Busato discloses the valve being actuated in a proportional mode with a pulse frequency of 200 Hz (Specification, page 16, line 34 – page 17, line2)

Regarding Claim 7, Busato discloses the switching device as a power transistor (element 26a in Fig. 4).

Claims 5, 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Busato in view of Horowitzh et al., Shacklock et al. and Klotz et al. (US 4,915,204). As was stated above, Busato, Horowitzh et al. and Shacklock et al. disclose all the elements of Claim 1. However, regarding Claim 5, they do not disclose the power

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source including the vehicle's electrical system. Since the Klotz et al. invention is intended for use for motor vehicle (col. 1, lines 7 – 15), its solenoid valve actuation system (element 3280 in Fig. 27B) is inherently fed by the vehicle's electrical system. Both references have the same problem solving area, namely providing solenoid valve activation system. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the Busato solution by applying it in the motor vehicle engine system, because such application would substantially expand the market of the Maller control system manufacturer.

Regarding Claim 6, Klotz et al. disclose the solenoid valve actuation system (elements 3250 and 3280 in Fig. 27B, col. 108, lines 22 - 35), which is a part of transmission control system (element 3050 in Fig. 27A) controlled in turn by the engine controller (element 3020 in Fig. 27A, col. 45, line 42 – col. 47, line 46). A motivation for modification of the primary reference is the same as above.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Busato in view of Horowitzh et al., Shacklock et al. and Maller (US 6,256,185). Claim 8 differs from Claims 1, 6 and 7 rejected above by its limitation of the protecting diode connected in parallel to the power transistor. Maller discloses a diode (element Z3 in Fig. 4) connected in parallel to the power transistor. The reference is pertinent to the problem, which Applicant faces, i.e. providing protection to the switching transistor against over-voltage stress. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have further modified the Busato solution by adding the

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protection diode in parallel to the switching transistor according to teachings of Maller, because as Maller states (col. 7, lines 40 – 44), diode Z3 protects switching transistors Q2 and Q3 from static and unexpected high voltage input at solenoid connection point, for example, a static discharge generated by the installer of the controller or solenoid.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Busato in view of Horowitz et al., Shacklock et al. and Butts et al. (US 4,796,853). As was stated above, Busato and Horowitz et al. disclose all the elements of Claims 1 and 3. Claim 4 differs from Claim 3 by a value of the activation frequency equal to 50 Hz. Butts et al. disclose the solenoid driver using PWM actuation with the actuation frequency of 50 Hz (col. 20, lines 37 – 45). The reference is pertinent to the instant case since it faces the same problem, i.e. providing a proportional and pulse control of the solenoid valve. In the Busato system modified according to teachings of Shacklock et al. the solenoid have parallel-connected free wheeling diode. The selected frequency should be high enough to develop uninterrupted and smoothed solenoid current and practically permanent pressure on the loaded spring and at the same time should not be too high due to inertia of the exponential decay of the over-voltage pulses across the solenoid coil. The selected frequency is therefore is a result effective variable, which can be set by optimization. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to adjust the activation frequency to value of 50 Hz, according to Butts et al. because as Court Decision *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) "Where the general conditions of a claim are disclosed in

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the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” And, *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976) the court states: In the case where the claimed ranges “overlap or lie inside ranges disclosed by the prior art” a prima facie case of obviousness exists.

Response to Arguments

Applicant's arguments have been given careful consideration but they are mostly moot in view of new grounds of rejection. However, some of them are to be addressed.

1. Appellant expresses his opinion that the “in solenoid controls such as Busato, where both high and low frequency signals are used for two modes of control, voltage suppression devices have generally been regarded as not desired as they have been thought of to interfere with the fine response required”. It is true, as Horowitz et al. state: “The only disadvantage of this protection circuit is that it lengthens the decay of current through inductor”. However, Shacklock et al. used the free wheeling diode connected across the solenoid at frequency 1 kHz, which is substantially higher than the highest Appellant frequency (200 Hz). Therefore, Shacklock et al. demonstrated driving solenoids with use of the protection devices at frequencies substantially higher than 200Hz without adversely affecting the response times that the concerns about timing parameters are moot for frequencies at least 5 times higher than the Appellant's 200 Hz. Therefore, use of the free wheeling diodes with frequencies 20 - 200 Hz cannot be considered as novelty.
2. Appellant alleges: “it has been surprisingly found that use of free wheeling diodes in proportional and pulsed mode control devices actually reduces noise for the control

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signals while permitting adequate response times" (page 4, 3rd paragraph). Even though Appellant's Specification is silent with regard to any feature of so-called pulse mode, as best understood by Examiner, both modes involve pulses, supposedly having different pulse widths. As to reduction of noise, Maller (US 6,256,185) discloses the free wheeling diode (D3 in Fig. 4) as maintaining a continuous current through solenoid during pulse (col. 2, lines 61 – 65). It is clear therefore, that usage of the free wheeling diode smoothes the shape of electrical pulses and reduces the noise. Therefore, reduction of noise due to usage of the free wheeling diodes is by no means unanticipated result, as Appellant alleges.

Additionally, reduction of noise is not mentioned in the Claims. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., reduction of noise) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

3. Appellant further charges: "highly controlled Busato device has not been seen as needing suppression devices as the voltage is controlled via pulse modulation".

However, to say so one should ignore collective experience of generations of designers, since such protection is used for at least last 50 years, and the multiple textbook sources presented in the Office Action by the citation from Horowitz et al. stating: "Always use a suppression diode when switching an inductive load" (legend under Fig.

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2.4). As to an impact of suppression devices on response times, it was addressed above.

4. Regarding Claim 8 rejection Appellant charges: "The Office Action asserts that Z3 of Maller is the further diode, but this is an element (which previously was asserted is part of the suppression device)". For the current stage of examination the statement is irrelevant. Appellant further alleges: "no motivation or teaching given to provide the Z3 device in parallel with the asserted transistor of Busato". The motivational statement is given above: It would have been obvious to one of ordinary skill in the art at the time the invention was made to have further modified the Busato solution by adding the protection diode in parallel to the switching transistor according to teachings of Maller, because as Maller states (col. 7, lines 40 – 44), diode Z3 protects switching transistors Q2 and Q3 from static and unexpected high voltage input at solenoid connection point, for example, a static discharge generated by the installer of the controller or solenoid.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zeev Kitov whose current telephone number is (571) 272 - 2052. The examiner can normally be reached on 8:00 – 4:30. If attempts to reach examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus can be reached on (571) 272 – 2800, Ext. 36. The fax phone number for organization where this application or proceedings is assigned is (571) 273-8300 for all communications.


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